REMARKS

Claims 10, 14, 15, 19-21, 23, 25 and 26 have been canceled, and new claims 27-30 have been added. Thus, claims 1, 7, 9, 11-13, 16-18, 22, 24 and 27-30 are pending in the present application for further prosecution. Independent claims 1 and 7 have been amended to distinguish over the prior art of record. No new matter was added. Accordingly, Applicants respectfully submit that claims 1, 7, 9, 11-13, 16-18, 22, 24 and 27-30 are in condition for allowance.

I. Claim Rejection - 35 USC §102(b)

A. In the non-final Office Action dated January 21, 2009, claims 1, 9, 10, 15 and 22 are rejected under 35 USC §102(b) as being anticipated by U.S. Patent No. 6,139,701 issued to Pavate et al.

Pavate et al. disclose a copper sputtering target having a tabular sputtering face (102a). For example, see FIG. 1 of the Pavate et al. patent in which the sputtering face (102a) of the sputtering target (102) is positioned within one end of a vacuum chamber (155) directly across from and parallel to substrates (140 and 150) onto which a thin film (152) is formed from atoms ejected from the sputtering face (102a) of the target. See column 3, line 10, to column 4, line 11, of the Pavate et al. patent for a discussion of the sputtering operation illustrated in FIG. 1.

Accordingly, it is clear that Pavate et al. fail to disclose a hollow cathode sputtering target. Rather, Pavate et al. disclose a typical tabular or planar disc sputtering target. Although FIG. 1 of the Pavate et al. patent discloses a tapered outer circumferential extension and flange, these are present merely for mounting purposes to secure the sputtering target (102) within the sputtering chamber and for connecting a negative of a DC voltage source (127) to the sputtering target (102). The hollow portion of the target (102) is the rear non-erosion face of the target that faces away from the vacuum chamber. A magnet (110) extends within the rear hollow portion of

target. See FIG. 1. Pavate et al. make clear that the magnet (110) is behind the target (102) relative to the sputtering face (102a) of the target (102).

Pavate et al. disclose that the sputtering face (102a) should have a surface roughness of less than 20 "micro inches" or less than 5 "micro inches". For example, on column 9, lines 61-65, Pavate et al. state: "In step 308, the **to-be-sputtered surface** of the copper target is final machined to achieve the desired surface roughness." In Pavate et al., the "to-be-sputtered surface" is the outer bottom face (102a) of the sputtering target (102). See FIG. 1.

Pavate et al. fail to provide any disclosure with respect to the surface roughness of the face of the target opposite face (102a) and adjacent the magnet (110). Since according to the teachings of Pavate et al., the face opposite sputtering face (102a) is a surface that is not a "to-be-sputtered surface", there is no common sense reason for reducing surface roughness of this non-erosion face of the sputtering target.

Turning to the present invention, it is directed to a "hollow cathode sputtering target". A "hollow cathode sputtering target" defines a specific target that is known by one of ordinary skill in the art. For example, see U.S. Patent No. 6,283,357 issued to Kulkarni et al. and U.S. Patent No. 6,887,356 B2 issued to Ford et al. which are both of record in the present application.

As best stated on column 1, lines 21-25, of Ford et al., "Conventionally, a sputtering source in the form of a planar disc or rectangle is used as the target, and ejected atoms travel along a line-of sight trajectory to deposit on top of a wafer whose deposition face is parallel to the erosion face of the target." This conventional sputtering source is that disclosed by the Pavate et al. patent.

Ford et al. explain the differences between a conventional target (i.e., a target disclosed by Pavate et al.) and a hollow cathode sputtering target (required by the claims of the present application) on column 1, lines 25-37. For example, Ford et al. state that a "hollow cathode

magnetron (HCM) sputtering target in the shape of an inverted crucible or cup can be used as the target material" and that an "inner chamber or sputtering cavity defined by the target contains plasma that erodes the interior wall surfaces of the target". Further, Ford et al. explain that magnetic fields "traject the ions in a direction perpendicular to the substrate". Still further, Kulkarni et al. teach that an "HCM target" has a "cup shape" and that "magnets are mounted on the exterior wall of the target, which creates a high density plasma inside the target". See column 1, lines 38-45, of the Kulkarni et al. patent. Finally, Kulkarni et al. acknowledge that "erosion of particles from the sputter target surface generally occurs in a relatively narrow ring-shaped region, called the 'racetrack region'." See column 1, lines 64-67, and column 56, lines 30-35 of the Kulkarni et al. patent.

Accordingly, as described in the present application, as filed, a hollow cathode sputtering target has a cup-shape, and it is the surface of the target within the cup (i.e. inner peripheral surface defining the hollow cavity within the cup) that is the sputtering face. The exterior or outer surface of the cup is a non-erosion surface that is adjacent to and faces magnets. The erosion portion of the sputtering face is the inner peripheral cylindrical wall of the cup-shaped body (for instance, see points 1, 2 and 3 identified in FIG. 1 of the present application, as filed.) The surface of the cup forming the inner bottom surface of the cup is a non-erosion portion (for instance, see points 4, 5 and 5 identified in FIG. 1).

A phenomenon unique to a hollow cathode sputtering target is that only the so-called ring-shaped "racetrack" area defined on the inner cylindrical peripheral surface of the sputtering target is subject to erosion. Thus, despite the fact that the inner bottom surface of the cup faces the space where plasma is generated, occupies a large portion of the opposing area, and is in close vicinity to the cylindrical erosion surface of the target, the inner bottom surface of the cup-shaped body is not eroded at all and thus forms a non-erosion surface of the target.

A problem created by this is that sputtered substances can deposit on the bottom face and then ultimately peel away from the bottom face causing the generation of particles during sputtering creating defects on the sputtered thin film. This problem with respect to peeling of redeposited substances on the inner bottom face is **unique** to hollow cathode sputtering targets due to their non-planar cup-shape configuration.

Applicant respectfully submits that Pavate et al. merely teaches to one of ordinary skill in the art to limit the surface roughness of an erosion surface of a tabular or planar sputtering target. It fails to provide any teaching relevant to a hollow cathode sputtering target (which is cup-shaped by definition) or to a desired surface roughness of a non-erosion bottom face portion of the target.

Further, conventional practice is to roughen non-erosion surfaces of sputtering targets so that such surfaces function as a "getter" for capturing particles. For example, when an erosion portion is sputtered, particles that deviate from the subject become an unintended deposited material on non-erosion portions of sputtering targets. Ultimately, this deposited material will peel off during the sputtering operation and cause the generation of particles. As a known method for preventing this, the surfaces of non-erosion portions (i.e., sidewalls) of tabular sputtering targets are roughened to cause redeposited particles to firmly affix to the non-erosion portions to prevent the possibility of peeling. Thus, conventionally, measures are taken to roughen the surfaces of non-erosion portions of tabular sputtering targets. For instance, refer to Paragraph No. 0031 of U.S. Patent Application No. 2002/0079217 A1 of Buehler (of record in the present application) that utilizes imprints on non-erosion sidewall surfaces of a tabular sputtering target to "retain redeposited material" to "prevent flakes of the redeposited material from falling off" the non-erosion surfaces during a sputtering operation.

Independent claim 1 of the present application requires a "hollow cathode sputtering target" comprising an "inner bottom face" that forms a "non-erosion portion" of the hollow cathode sputtering target and a "cylindrical inner peripheral face" that forms an "erosion portion" of the hollow cathode sputtering target. A surface roughness (Ra) of the inner bottom face, which is a non-erosion portion of the hollow cathode sputtering target, is required to be $Ra \leq 1.0 \mu m$ as well as being equal to or less than a surface roughness (Ra) of the cylindrical inner peripheral face which is an erosion portion of the hollow cathode sputtering target. No new matter was added. For example, see the limitations previously stated in canceled claims 10, 14, 15, 19, 23, 25 and 28 of the present application.

It is clear that a claim of a patent application can be properly anticipated under 35 USC §102 only if each and every element is found described in a single prior art reference. The **identical invention** must be shown in as complete detail as contained in the claim, and the elements identified by the reference must be **arranged as required by the claim**. If a prior art reference relied on in a rejection made under 35 USC §102 does not contain every element recited in the claim in as complete detail as is contained in the claim and arranged as recited in the claim, the anticipation rejection has been overcome and must be removed.

Based on the amendments made to the claims of the present application, Applicants respectfully submit that claim 1 is not anticipated by the Pavate et al. patent. Pavate et al. fail to disclose a hollow cathode sputtering target. In addition, the erosion portion of Pavate et al. is the flat face (102a) illustrated in FIG. 1 of the Pavate et al. patent. The erosion portion is not a cylindrical inner peripheral face of the target, and Pavate et al. clearly fail to provide any disclosure with respect to the surface roughness of an "inner bottom face" of a cup-shaped target or the relative surface roughness between the "inner bottom face" of the cup-shaped target and the "cylindrical inner face of the target".

Still further, as discussed above, conventional teaching would lead one of ordinary skill in the art to make non-erosion surfaces, such as the bottom inner wall, rough in comparison to erosion surfaces so that they capture redeposited material. However, Applicant has found that the roughened inner bottom walls of hollow cathode sputtering targets were not able to prevent peeling of deposited material during sputtering. Rather, large quantities of particles were generated. This was determined to be a phenomenon unique to hollow cathode sputtering targets and one that is not experienced when sputtering tabular targets.

Accordingly, Pavate et al. clearly fail to disclose every element recited in claim 1 of the present application in as complete detail as is contained in claim 1 and arranged as recited in claim 1. Further, Pavate et al. fail to disclose the above referenced problem that is unique to hollow cathode sputtering targets much less provide a solution. Thus, Applicants respectfully request reconsideration and removal of the anticipation rejection of the claims 1, 9 and 22 of the present application. Independent claim 7 of the present application has been amended in a similar manner as claim 1. Accordingly, Applicants also respectfully request reconsideration and removal of the anticipation rejection of method claim 7.

B. In the non-final Office Action dated January 21, 2009, claims 1, 7, 9, 22 and 24 are rejected under 35 USC §102(b) as being anticipated by U.S. Patent No. 6,153,315 issued to Yamakoshi et al.

Yamakoshi et al. disclose controlling the surface roughness of an erosion portion of a sputtering target. For example, column 2, lines 34-36, of Yamakoshi et al. discloses that "the number of produced nodules is reduced as the surface roughness of the sputtering target **surface to be eroded** was made smoother." Also see column 3, lines 10-25, of Yamakoshi et al. which teaches: "the surface roughness of **a surface to be eroded** is provided at 1.0μm or less" and then provides reasons for why this improves sputtering and reduces the number of particles generated.

Thus, Yamakoshi et al. disclose a desired surface roughness for the erosion portion of the target, not the non-erosion portions of the target.

Accordingly, Yamakoshi et al. fail to provide any disclosure with respect to the surface roughness of a non-erosion portion of a target, and there is no common sense reason provided by Yamakoshi et al. for reducing surface roughness of a non-erosion inner bottom face of a hollow cathode sputtering target.

As discussed above, the present invention is directed to a "hollow cathode sputtering target". A "hollow cathode sputtering target" defines a specific target that is known by one of ordinary skill in the art. For example, see U.S. Patent No. 6,283,357 issued to Kulkarni et al. and U.S. Patent No. 6,887,356 B2 issued to Ford et al. which are both of record in the present application.

As best stated on column 1, lines 21-25, of Ford et al., "Conventionally, a sputtering source in the form of a planar disc or rectangle is used as the target, and ejected atoms travel along a line-of sight trajectory to deposit on top of a wafer whose deposition face is parallel to the erosion face of the target." Ford et al. explain the differences between a conventional target and a hollow cathode sputtering target on column 1, lines 25-37. For example, Ford et al. state that a "hollow cathode magnetron (HCM) sputtering target in the shape of an inverted crucible or cup can be used as the target material" and that an "inner chamber or sputtering cavity defined by the target contains plasma that erodes the interior wall surfaces of the target". Further, Ford et al. explain that magnetic fields "traject the ions in a direction perpendicular to the substrate". Still further, Kulkarni et al. teach that an "HCM target" has a "cup shape" and that "magnets are mounted on the exterior wall of the target, which creates a high density plasma inside the target". See column 1, lines 38-45, of the Kulkarni et al. patent. Finally, Kulkarni et al. acknowledge that "erosion of particles from the sputter target surface generally occurs in a relatively narrow

ring-shaped region, called the 'racetrack region'." See column 1, lines 64-67, and column 56, lines 30-35 of the Kulkarni et al. patent.

Accordingly, as described in the present application, as filed, and in Kulkarni et al., a hollow cathode sputtering target has a cup-shape, and it is the surface of the target within the cup (i.e. inner peripheral surface defining the hollow cavity within the cup) that is the sputtering face. The exterior or outer surface of the cup is a non-erosion surface that is adjacent to and faces magnets. The erosion portion of the sputtering face is the inner peripheral cylindrical wall of the cup-shaped body (for instance, see points 1, 2 and 3 identified in FIG. 1 of the present application, as filed.) The surface of the cup forming the inner bottom surface of the cup is a non-erosion portion (for instance, see points 4, 5 and 5 identified in FIG. 1).

A phenomenon unique to a hollow cathode sputtering target is that only the so-called ring-shaped "racetrack" area defined on the inner cylindrical peripheral surface of the sputtering target is subject to erosion. Thus, despite the fact that the inner bottom surface of the cup faces the space where plasma is generated, occupies a large portion of the opposing area, and is in close vicinity to the cylindrical erosion surface of the target, the inner bottom surface of the cup-shaped body is not eroded at all and thus forms a non-erosion surface of the target.

A problem created by this is that sputtered substances can deposit on the bottom face and then ultimately peel from the bottom face causing the generation of particles during sputtering and creating defects on the sputtered thin film. This problem with respect to peeling of redeposited substances on the inner bottom face is unique to hollow cathode sputtering targets due to their non-planar cup-shape configuration.

Applicant respectfully submits that Yamakoshi et al. merely teaches to one of ordinary skill in the art to limit the surface roughness of an erosion surface of a sputtering target. It fails

to provide any teaching relevant to an inner bottom surface of a hollow cathode sputtering target or to a desired surface roughness of a non-erosion portion of the target.

Further, conventional practice is to roughen non-erosion surfaces of sputtering targets so that such surfaces function as a "getter" for capturing particles. For example, when an erosion portion is sputtered, particles that deviate from the subject become an unintended deposited material on non-erosion portions of the sputtering target. Ultimately, this deposited material will peel off during the sputtering operation and cause the generation of particles. As a known method for preventing this, the surfaces of non-erosion portions of sputtering targets are roughened to cause redeposited particles to firmly affix to the non-erosion portions whereby peeling is prevented. Thus, conventionally, measures are taken to roughen the surfaces of non-erosion portions of sputtering targets. For instance, refer to Paragraph No. 0031 of U.S. Patent Application No. 2002/0079217 A1 of Buehler (of record in the present application) that utilizes imprints on non-erosion sidewall surfaces of a sputtering target to "retain redeposited material" to "prevent flakes of the redeposited material from falling off" the non-erosion surfaces during a sputtering operation. Also, see page 2, lines 15-18, and page 2, line 26, to page 3, line 5, of the present application, as filed.

Independent claim 1 of the present application requires a "hollow cathode sputtering target" comprising an "inner bottom face" that forms a "non-erosion portion" of the hollow cathode sputtering target and a "cylindrical inner peripheral face" that forms an "erosion portion" of the hollow cathode sputtering target. A surface roughness (Ra) of the inner bottom face, which is a non-erosion portion of the hollow cathode sputtering target, is required to be $Ra \leq 1.0\mu m$ as well as being equal to or less than a surface roughness (Ra) of the cylindrical inner peripheral face which is an erosion portion of the hollow cathode sputtering target. No new

matter was added. For example, see the limitations previously stated in canceled claims 10, 14, 15, 19, 23, 25 and 28 of the present application.

It is clear that a claim of a patent application can be properly anticipated under 35 USC §102 only if each and every element is found described in a single prior art reference. The **identical invention** must be shown in as complete detail as contained in the claim, and the elements identified by the reference must be **arranged as required by the claim**. If a prior art reference relied on in a rejection made under 35 USC §102 does not contain every element recited in the claim in as complete detail as is contained in the claim and arranged as recited in the claim, the anticipation rejection has been overcome and must be removed.

Based on the amendments made to the claims of the present application, Applicant respectfully submits that claim 1 is not anticipated by the Yamakoshi et al. patent. Yamakoshi et al. fail to disclose a hollow cathode sputtering target, a cylindrical inner peripheral face of the target that is an erosion portion of the target, or the surface roughness of the inner bottom face (a non-erosion portion) of the target or the relative surface roughness between the inner bottom face (a non-erosion portion) of the target and the cylindrical inner face of the target (an erosion-portion).

Still further, as discussed above, conventional teaching would lead one of ordinary skill in the art to make non-erosion surfaces, such as the bottom inner wall, rough in comparison to erosion surfaces so that they capture redeposited material. However, Applicant has found that roughened inner bottom walls of hollow cathode sputtering targets are not able to adequately prevent peeling of deposited material during sputtering. Rather, large quantities of particles were generated. This was determined to be a phenomenon unique to hollow cathode sputtering targets.

Accordingly, Yamakoshi et al. clearly fail to disclose every element recited in claim 1 of the present application in as complete detail as is contained in claim 1 and arranged as recited in claim 1. Further, Yamakoshi et al. fail to disclose the above referenced problem that is unique to hollow cathode sputtering targets much less provide a solution. Thus, Applicant respectfully request reconsideration and removal of the anticipation rejection of claims 1, 9 and 22 of the present application. Independent claim 7 of the present application has been amended in a similar manner as claim 1. Accordingly, Applicant also respectfully requests reconsideration and removal of the anticipation rejection of method claims 7 and 24.

II. Claim Rejection - 35 USC §103(a)

A. In the non-final Office Action dated January 21, 2009, claims 11-14 and 16-21 are rejected under 35 USC §103(a) as being obvious over U.S. Patent No. 6,139,701 issued to Pavate et al. in view of U.S. Patent No. 6,283,357 B1 issued to Kulkarni et al. and in further view of U.S. Patent Application No. 2002/0079217 A1 of Buehler.

The deficiencies of Pavate et al. are discussed above in detail with respect to the §102(b) rejection. Pavate et al. disclose a tabular sputtering target having a planar sputtering face (102a). The surface roughness of the entire sputtering face, which is the erosion portion of the target, is reduced. Pavate et al. fail to disclose the limitations of claim 1 of the present application concerning a "hollow cathode sputtering target" comprising an "inner bottom face" that forms a "non-erosion portion" of the hollow cathode sputtering target and a "cylindrical inner peripheral face" that forms an "erosion portion" of the hollow cathode sputtering target. Pavate et al. also fails to disclose that a surface roughness (Ra) of the inner bottom face, which is a non-erosion portion of the hollow cathode sputtering target, is required to be $Ra \leq 1.0 \mu m$ as well as being equal to or less than a surface roughness (Ra) of the cylindrical inner peripheral face which is an erosion portion of the hollow cathode sputtering target. In addition, Pavate et al. fail to disclose

the problem created by the peeling of redeposited material on the inner bottom face of a hollow cathode sputtering target and certainly fails to provide a solution.

In the Office Action, Kulkarni et al. is stated as disclosing "a hollow clad sputtering target with a bottom inside face, a peripheral cylindrical surface, and an outer peripheral edge". While Kulkarni et al. acknowledges that the inner bottom face is a non-erosion portion of a hollow cathode sputtering target (i.e., see column 1, lines 64-67), it fails to disclose problems with respect to the peeling of redeposited material on the inner bottom face during sputtering. Thus, Kulkarni et al. clearly fail to disclose that a surface roughness (Ra) of the inner bottom face, which is a non-erosion portion of the hollow cathode sputtering target, is required to be $Ra \leq 1.0 \mu m$ as well as being equal to or less than a surface roughness (Ra) of the cylindrical inner peripheral face which is an erosion portion of the hollow cathode sputtering target.

In the Office Action, Buehler is stated as disclosing a "sputtering target treatment in which peripheral areas of the target are roughened by imprints." However, Buehler relates to tabular targets and disclose nothing with respect to hollow cathode sputtering targets. As shown in FIG. 4 of Buehler, the tabular sputtering target (102) has a planar disc-shaped sputtering face (103). The rear face of the target (102) is connected to a backing plate (104) that provides a tapered sidewall (109) and circumferential mounting flange (115). The sidewalls of the target and the backing plate are non-erosion portions of the target and do not form a part of the sputtering face (103). Buehler teaches that such non-erosion surfaces of tabular targets should be roughened by means of imprints. As stated on Paragraph No. 0031 of Buehler, the imprints "retain redeposited material" during a sputtering operation and "prevent flakes from falling off".

Accordingly, as clearly taught by the above referenced prior art, it is clearly known to reduce the surface roughness of the planar sputtering face of tabular sputtering targets (i.e., the

erosion portion of a target) and to roughen the non-erosion surfaces (such as the sidewalls of a tabular target). However, this teaches away from the present invention.

"Teaching away" is the antithesis of the art suggesting that the person of ordinary skill in the art go in the claimed direction. Essentially, "teaching away" is a per se demonstration of lack of obviousness. In re Fine, 873 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Independent claim 1 of the present invention is directed to a hollow cathode sputtering target, such as disclosed by the Kulkarni et al. patent. The sputtering face of such a cup-shaped target is the inner face of the cup-shaped target that defines a hollow cavity within the target. The erosion portion of the target is the inner peripheral cylindrical wall. As discussed previously, a phenomenon unique to a hollow cathode sputtering target is that despite the fact that the inner bottom surface of the cup faces the space where plasma is generated, occupies a large portion of the opposing area, and is in close vicinity to the cylindrical erosion surface of the target, the inner bottom surface of the cup-shaped body is not eroded at all and thus forms a non-erosion surface of the target.

Following the teachings of Buehler and conventional practice, the non-erosion surfaces of the target would be roughened so that such surfaces capture particles. However, claim 1 of the present application requires the opposite. The surface roughness of the inner bottom face is reduced such that it is equal to or less than that of the erosion portion (inner peripheral cylindrical wall) of the target and is less than or equal to 1.0μm. This is not fairly disclosed, taught or suggested by the cited prior art. Rather, the prior art teaches to roughen non-erosion surfaces relative to erosion surfaces of sputtering targets. Thus, one of ordinary skill in the art following the teachings of the above cited prior art would be provided with no common sense reason for reducing the surface roughness of the inner bottom wall of a cup-shaped target to the

extent required by claim 1 of the present application. Independent claim 7 of the present application includes similar limitations.

For the reasons discussed above, Applicant respectfully submits that claims 11-13 and 16-18 are patentable and non-obvious relative to Pavate et al. in view of Kulkarni et al. and further in view of Buehler. Applicant respectfully requests reconsideration and removal of the rejection.

B. In the non-final Office Action dated January 21, 2009, claims 11-14 and 16-21 are rejected under 35 USC §103(a) as being obvious over U.S. Patent No. 6,153,315 issued to Yamakoshi et al. in view of U.S. Patent No. 6,283,357 B1 issued to Kulkarni et al. and in further view of U.S. Patent Application No. 2002/0079217 A1 of Buehler.

The deficiencies of Yamakoshi et al. relative to the limitations of claim 1 of the present application are discussed above in detail with respect to the §102(b) rejection. The secondary references, Kulkarni et al. and Buehler, are discussed above in detail with respect to the rejection based on Pavate et al. in view of Kulkarni et al and further in view of Buehler.

Applicant respectfully submits that for the same reasons discussed above with respect to the rejection based on Pavate et al. in view of Kulkarni et al and further in view of Buehler, claims 11-13 and 16-18 are patentable and non-obvious relative to Yamakoshi et al. in view of Kulkarni et al. and further in view of Buehler. Accordingly, Applicant respectfully requests reconsideration and removal of the rejection.

C. *In the non-final Office Action dated January 21, 2009, claims 22, 25 and 26 are rejected under 35 USC §103(a) as being obvious over U.S. Patent No. 6,153,315 issued to Yamakoshi et al. in view of U.S. Patent No. 6,283,357 B1 issued to Kulkarni et al.*

The deficiencies of Yamakoshi et al. relative to the limitations of claim 1 of the present application are discussed above in detail with respect to the §102(b) rejection. The secondary reference, Kulkarni et al., is discussed above in detail with respect to the rejection based on Pavate et al. in view of Kulkarni et al and further in view of Buehler.

Applicant respectfully submits that for the same reasons discussed above with respect to the rejection based on Pavate et al. in view of Kulkarni et al and further in view of Buehler, claim 22 is patentable and non-obvious relative to Yamakoshi et al. in view of the Kulkarni et al. patent. Accordingly, Applicant respectfully requests reconsideration and removal of the rejection.

D. *In the non-final Office Action dated January 21, 2009, claim 23 is rejected under 35 USC §103(a) as being obvious over U.S. Patent No. 6,139,701 issued to Pavate et al. in view of U.S. Patent No. 6,283,357 B1 issued to Kulkarni et al.*

Claim 23 has been canceled; however, independent claim 1 has been amended to include the limitations of claim 23. The deficiencies of Pavate et al. relative to the limitations of claim 1 of the present application are discussed above in detail with respect to the §102(b) rejection. The secondary reference, Kulkarni et al., is discussed above in detail with respect to the rejection based on Pavate et al. in view of Kulkarni et al and further in view of Buehler.

Applicant respectfully submits that for the same reasons discussed above with respect to the rejection based on Pavate et al. in view of Kulkarni et al and further in view of Buehler, claim 1 is patentable and non-obvious relative to Pavate et al. in view of the Kulkarni et al.

patent. Accordingly, Applicant respectfully requests reconsideration and removal of the rejection.

III. New Claims 27-30

New claims 27-30 have been added. No new matter was added. For example, see: the limitations of claim 1; reference to a "cup" shape on page 5, line 15 (also see FIG. 1); reference to generating a high density plasma within the cup-shaped target on page 1, lines 24-25; reference to an outer peripheral face of the target on page 6, lines 3-4 (also see FIG. 1); and reference to a curved face on page 6, lines 10-13, (also see FIG. 1) of the present application, as filed. For claims 29 and 30, see Example 1 on page 6, line 22, and Example 3 on page 8, line 26, of the present application, as filed.

IV. Conclusion

In view of the above amendments and remarks, Applicant respectfully submits that the claim rejections have been overcome and that the present application is in condition for allowance. Thus, a favorable action on the merits is therefore requested.

Please charge any deficiency or credit any overpayment for entering this Amendment to our deposit account no. 08-3040.

Respectfully submitted,
Howson & Howson LLP
Attorneys for Applicants

By /William Bak/
William Bak
Reg. No. 37,277
501 Office Center Drive
Suite 210
Fort Washington, PA 19034
(215) 540-9216